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External Collaboration and Performance: North Carolina Local Public Health Departments, 1996

S Y N O P S I S

Objectives. This study examined the extent to which local public health departments in North Carolina collaborated with other groups and organizations, the health problems on which they worked together, and the effect of external collaboration on health departments' performance on core public health functions.

Methods. The author mailed a questionnaire asking about interactions with city and county government agencies, boards of health, schools, nonprofits, physicians/private clinics, community health centers/migrant clinics, community members, citizens' groups, state and federal agencies, and universities to all of the directors of local public health departments in North Carolina. Sixty-four directors returned the questionnaire, for a response rate of 74.4%.

Results. Local public health departments most frequently interacted with boards of health, state agencies, community members, schools, city and county government agencies, and nonprofit agencies. Large majorities reported productive relationships with boards of health, state agencies, city and county government agencies, schools, nonprofit agencies, and hospitals. Greater frequency of interaction with several types of partners was associated with better performance.

Conclusions. While questions exist about whether performance on core functions improves the community's health status, the results suggest that it is important for local public health departments to continue to build relationships with other organizations in the community.

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Public health problems are complex and have multiple psychological, behavioral, organizational, and social determinants.^{1,2} Effective public health interventions address these different levels of influence.² Thus, it takes public health professionals trained in different disciplines and a wide range of groups and organizations to effectively address a community's health. In such collaborative work, each discipline, group, and organization can bring its unique perspective, analytical skills, and resources to an understanding of the determinants of public health problems and the development of interventions that will most effectively address them.¹⁻³ Recognizing this, policy initiatives such as the 1996 Institute of Medicine report, *Healthy Communities: New Partnerships for the Future of Public Health*,⁴ have advocated that local public health departments work collaboratively with managed care organizations, physicians, other health and human service providers, citizens' groups, and other community organizations to share responsibility for the community's health. Efforts to "reinvent" government and changes in public health financing have also pushed local public health departments to work with other organizations so that public health services can be delivered more efficiently and effectively.⁵

Only a few studies have documented the effects of collaboration on the performance of local public health departments or on community health outcomes.⁶⁻⁸ A recent study of 63 local public health departments found that outside agencies contributed more than 26% of the total effort per public health jurisdiction in terms of 10 public health practices (assess, investigate, analyze, advocate, prioritize, plan, manage, implement, evaluate, inform/educate).⁶ In a follow-up study, researchers systematically documented the interactions of the 63 public health departments with hospitals, health centers, managed care organizations, private physicians, and nonprofit agencies.⁷ Interactions differed in their purpose (for example, planning, service delivery) and in how they were structured (through joint initiatives, contracts/agreements, funding mechanisms, or informal interactions). "High-performing" health departments were similar to "low-performing" departments in the extent of their interactions with other organizations. A qualitative analysis of 12 high-performing jurisdictions suggested that while organizations may report a high level of interaction, the variety of reasons for which organizations undertook these interactions may have resulted in insufficient attention to the core public health functions to affect performance.

When local public health departments interact with external individuals, groups, and organizations, depart-

ment personnel may learn important information about the community, including information on the health status, needs, and assets of the populations they serve as well as on the feasibility and acceptability of specific public health interventions.⁹ They also learn about the goals and priorities, strengths and limitations, of external organizations, their investment in promoting the community's health, and their potential as partners.^{10,11} When public health agencies develop productive relationships with external groups and organizations, the capacity to make long-term community-wide changes is enhanced.⁹⁻¹²

In the summer of 1996, I surveyed the directors of local public health departments in North Carolina to: (a) document health directors' perceptions of the extent of their departments' interactions with other organizations and the productivity of these relationships; (b) document the health issues around which local public health departments interacted with other organizations; and (c) describe the association between agencies' external collaborations and their performance on the core public health functions identified in the 1988 Institute of Medicine report, *The Future of Public Health: assessment, assurance, and policy development*.¹³ The research reported here is part of a larger study on multidisciplinary and multi-organizational collaboration in North Carolina public health departments.¹⁴ In North Carolina, each of 86 locally controlled public health departments has statutory authority to serve one or more of the state's 100 counties. Each reports to a local board of health appointed by the county commissioners. Seventy-eight are single-county departments, and eight departments serve multiple counties.

METHODS

Using Dillman's mail survey method,¹⁵ I mailed questionnaires to the directors of all 86 local public health departments and then mailed a reminder postcard after one week. I mailed a second copy of the questionnaire, if necessary, after three weeks.

Among other questions, the questionnaire asked about agencies' interactions with other individuals, groups, and organizations, the health issues that were the focus of these interactions, and agencies' performance on the three core public health functions. Because common method variance (associations between the variables resulting from having one rater answer all of the questions) was a potential problem in the analysis of the relationship between collaboration and performance, I placed the dependent variable (performance) after the

independent variables (extensiveness of interactions and productivity of relationships) on the questionnaire.¹⁶

External collaboration. Directors reported on the "extent" of interactions with specific groups/organizations in carrying out the core public health functions and the "productivity" of their agencies' relationships with these organizations. They rated "extent" on a 5-point Likert scale from 1 = not at all to 5 = to a great extent and "productivity" on a 5-point scale from 1 = not at all productive to 5 = very productive. "Not applicable" was a response option that indicated the specific type of organization did not exist in the community.

The "extent" and "productivity" questions were separated spatially in the questionnaire by questions about specific health issues to diminish consistency bias and the possibility that agency directors might have implicit theories that more interaction would equal better relationships.¹⁶

Health issues. On a 5-point Likert scale (from 1 = not at all to 5 = to a great extent), directors also reported on the extent to which their agencies interacted with other groups in the community around specific health issues. These issues were identified in an earlier study of public health departments' performance on core functions.¹⁷

Agency performance. On a 5-point scale, each director rated how adequately his or her agency accomplished four actions found by Miller and his colleagues, in a screening survey,¹⁸ to accurately predict health department performance on the IOM core functions.¹⁹ The items were:

1. In the past three years in your jurisdiction, have there been age-specific surveys to assess participation in prevention and screening services? (*Assessment*)
2. In the past year, has there been a formal attempt to inform candidates for elective office about health priorities for your jurisdiction? (*Policy Development*)
3. In the past year in your jurisdiction, has a community health action plan, developed with public participation, been used? (*Policy Development*)
4. In this past year in your jurisdiction, has there been any evaluation of the effect that public health services have on community health? (*Assurance*)

Following Miller et al.,^{18,19} I calculated performance by averaging each director's responses to the four questions and dividing the average by 5. This resulted in a performance score that was a decimal portion of a perfect score of 1.0, with higher scores indicating better performance.

Control variables. Jurisdiction census and rurality served as control variables because of the possibility that higher performance scores would reflect the greater resources available to larger and less rural local public health departments and thus confound the analyses. I used 1997 Census estimates²⁰ for jurisdiction size and the 1993 US Department of Agriculture (USDA) Urban Influence Code²¹ as a measure of rurality. The USDA codes range from 1 ("Large metro") to 9 ("Non-metro/not adjacent to metro area and contains no part of a city with at least 2,500 residents"). Thus, the higher the Urban Influence Code, the more rural the county.

Data analysis. First, I used descriptive statistics to characterize respondents and chi-square tests to compare respondents and non-respondents in terms of single-county vs multi-county status, jurisdiction size category, and Urban Influence Code. Second, I computed frequencies to describe the extent of agencies' interactions with other partners, the productivity of their relationships, and their interactions around specific health issues. Third, I used correlation analysis to examine the relationship between extent of interaction and productivity of relationship for each type of external organization or group. These variables were correlated. However, SAS collinearity diagnostics yielded low condition indices; that is, the correlations among the variables (extent and productivity) should not pose a significant problem for the regression analyses.²² Fourth, to describe the relationships between agency performance and collaboration with specific types of partners, I used multiple regression analysis. In each regression equation, I regressed local public health performance on four variables: extent of interaction with a particular type of external partner, productivity of relationship with the same type of partner, jurisdiction size, and Urban Influence Code. The results of each equation describe the relationship between performance and each variable in the model, given the presence of the other variables.

RESULTS

Respondents. Sixty-four local public health department directors completed and returned the questionnaire, for a response rate of 74.4%. Of the respondents, 59 were from single-county health departments, and five were from district, or multiple-county, health departments. Eleven (17.2%) of the respondents represented jurisdictions of fewer than 25,000 people; 14 (21.9%) were from jurisdictions of 25,000 to 49,000 people; 18 (28.1%) were from jurisdictions of 50,000 to 99,999; 15 (23.4%) were

from jurisdictions of 100,000 to 249,999; 3 (4.7%) were from jurisdictions of 250,000 to 500,000; and another 3 (4.7%) were from jurisdictions of more than 500,000 people.

Almost half (46.9%) of the responding departments were in jurisdictions including either a "Large metro" or "Small metro" county; 14.1% were from jurisdictions representing the three most rural categories on the urban influence scale. Directors reported training in public health (57%), nursing (23%), medicine (12%), environmental sciences (9%), business/public administration (37%), and other professional fields (19%).

Three of the non-respondents were from district, that is, multi-county, health departments; 19 were from single-county departments. Respondents did not differ from non-respondents in terms of single-county vs multi-county status ($\chi^2 = 0.658, P < 0.417$), jurisdiction size category ($\chi^2 = 4.244, P < 0.644$) or in terms of rurality as measured by the Urban Influence Code ($\chi^2 = 11.420, P < 0.179$).

Extent of interactions. Table 1 shows the reported extent of local public health departments' interactions with other individuals, groups, and organizations and the reported productivity of these relationships.

A majority of directors described their agencies as interacting frequently with boards of health (81.2% described the extent to which they interacted as "much" or "to a great extent"), state agencies (68.8%), community members

(60.9%), schools (58.7%), city and county government agencies (57.8%), and nonprofit agencies (56.3%).

Few public health departments interacted extensively with federal agencies (71.8% of local public health departments reported "no" or "a little" interaction with federal agencies) or universities (53.9% reported "no" or "a little" interaction). For community health centers and migrant clinics, 48.4% reported "no" or "a little" interaction, while 24.2% reported interacting "much" or "to a greater extent."

Productivity of interactions. Large majorities of the directors reported that relationships were "moderately" or "very productive" with boards of health (89% of those reporting interaction with boards of health), state agencies (87.3%), city and county government agencies (84.2%), schools (79.6%), nonprofit agencies (76.6%), and hospitals (72.5%). Overall, more than 50% of directors reported "moderately" or "very productive" relationships with each type of outside partner other than federal agencies and universities.

Twenty-four percent of local public health departments reported no interactions with community health centers and migrant clinics; of those interacting with community health centers and migrant clinics, 34.5% reported that their relationships were "not at all" or "not very productive." Similarly, many local public health departments reported unproductive relationships with federal government agencies (51.8%) and universities (32.8%).

Table 1. Percentages of local public health departments reporting interactions with outside individuals, groups, and organizations, by reported extent of interactions and reported productivity of relationships

Individual, group, or organization	n	Extent of interactions					To a great extent	n	Productivity of relationships				
		Not at all	A little	Some	Much	Not at all productive			A little productive	Some-what productive	Mod-erately pro-ductive	Very pro-ductive	
City/county government agencies	64	—	10.9	31.3	28.1	29.7	63	—	7.9	7.9	30.2	54.0	
Boards of health	64	—	4.7	14.1	32.8	48.4	64	—	3.1	7.8	20.3	68.8	
Schools	63	—	12.7	28.6	33.3	25.4	64	—	6.3	17.2	29.7	46.9	
Nonprofit agencies	64	—	12.5	31.3	39.1	17.2	64	—	4.7	18.8	39.1	37.5	
Hospitals	64	4.7	14.1	42.2	18.8	20.3	62	—	8.1	19.4	41.9	30.6	
Physicians/private clinics . . .	64	4.7	20.3	46.9	15.6	12.5	63	—	11.1	25.4	36.5	27.0	
Community health centers/ migrant health clinics	62	24.2	24.2	27.4	17.7	6.5	55	14.5	20.0	25.5	20.0	20.0	
Community members	64	—	17.2	21.9	48.4	12.5	63	1.6	1.6	33.3	23.8	39.7	
Citizens' groups	64	1.6	12.5	37.5	34.4	14.1	63	1.6	7.9	30.2	33.3	27.0	
State agencies	64	—	9.4	21.9	46.9	21.9	63	—	4.8	7.9	33.3	54.0	
Federal agencies	64	23.4	48.4	28.1	—	—	58	12.1	39.7	29.3	15.5	3.4	
Universities	63	19.0	34.9	36.5	7.9	1.6	58	6.9	25.9	32.8	20.7	13.8	

Table 2. Percentages of local public health departments reporting interactions with outside individuals, groups, and organizations around specific issues

Issue	n	Not at all	Little extent	Some extent	Moderate extent	Great extent
Environmental health	64	1.6	7.8	32.8	34.4	23.4
AIDS/HIV	64	—	10.9	32.8	29.7	26.6
Child health	63	1.6	9.5	27.0	41.3	20.6
Substance abuse	64	1.6	37.5	39.1	14.1	7.8
Family planning	64	1.6	9.4	45.3	29.7	14.1
Infant mortality	64	—	7.8	25	39.1	28.1
Chronic disease prevention	64	—	17.2	29.7	40.6	12.5
Home health	60	18.3	20.0	13.3	26.7	21.7
Mental health	64	9.4	39.1	43.8	7.8	—
Immunizations	64	—	1.6	20.3	37.5	40.6
STD prevention	64	—	14.1	32.8	32.8	20.3
TB control	63	1.6	15.9	27.0	36.5	19.0
Care of the indigent	64	1.6	15.6	34.4	29.7	18.8
Care of the uninsured	64	3.1	14.1	37.5	23.4	21.9

Health issues. Table 2 shows that 78.1% of local public health departments interacted “much” or “to a great extent” with other individuals, groups, and organizations with regard to immunizations, as did 67.2% with regard to infant mortality and 61.9% around child health. More than half also reported interacting “much” or “to a great extent” around environmental health (57.8%), AIDS/HIV (56.3%), and TB control (55.5%). Fewer agencies interacted with others around substance abuse (39.1% reported “no” or “a little” interaction around substance abuse), home health (38.3%) and mental health (48.5%). Almost 20% of the agencies reported “no” or “a little” interaction around TB control, care of the indigent and uninsured, and chronic disease prevention.

Extent-productivity correlations. A correlation analysis showed that extent of interaction was usually correlated with productivity of relationships; thus, the more the department interacted with a specific type of organization, the better their reported relationships. Extent-productivity correlations were 0.47 for city/county government, 0.59 for boards of health, 0.62 for schools, 0.58 for nonprofits, 0.65 for hospitals, 0.38 for physicians and private clinics, 0.69 for community health centers/migrant clinics, 0.54 for community members, 0.60 for citizens’ groups, 0.39 for state government, 0.39 for the federal government, and 0.65 for universities.

Agency performance. The average performance score was 0.55 (standard deviation [SD] = 0.18; reliability coefficient

= 0.73). This was comparable to the average performance scores found in three national studies of local health departments using the same or similar measures.¹⁹ Table 3 shows the results of the regression analyses predicting agency performance, as measured by performance scores. As seen in the table, jurisdiction size was a consistent predictor of performance, with the greater the jurisdiction size, the better the department performance on the core functions. Rurality, in contrast, was not a predictor of performance.

Greater frequency of interaction predicted better department performance for interactions with schools, hospitals, and community health centers/migrant clinics. The more productive the agency’s relationships with city and county governments, boards of health, community members, citizens’ groups, and state and federal government agencies were reported to be, the better the agency’s performance. Overall, the most variance in performance was explained by equations showing agency interactions with city/county government (21% of the variance explained), boards of health (21%), community members (21%), citizens’ groups (21%), and hospitals (19%).

DISCUSSION

Taken together, these findings suggest several implications for public health practice and research. First, the results indicate that there is a positive relationship between the extent of collaboration with schools, hospitals, and community health centers/migrant clinics and public health performance. Productivity of relationships

Table 3. Results of regression analyses predicting local public health department performance

Predictor variables	Beta coefficient	F-value	R-squared
Jurisdiction size	0.28 ^a	3.96 ^b	0.21
Rurality	0.07		
Extent to which agency interacts with city/county government agencies	0.00		
Productivity of agency's relationships with city/county government agencies	0.37 ^b		
Jurisdiction size	0.34 ^b	3.98 ^b	0.21
Rurality	0.03		
Extent to which agency interacts with boards of health	0.13		
Productivity of agency's relationships with boards of health	0.28 ^a		
Jurisdiction size	0.07	3.24 ^b	0.18
Rurality	0.09		
Extent to which agency interacts with schools	0.32 ^a		
Productivity of agency's relationships with schools	0.01		
Jurisdiction size	0.27 ^a	2.79 ^a	0.16
Rurality	0.11		
Extent to which agency interacts with nonprofit agencies	0.22		
Productivity of agency's relationships with nonprofit agencies	0.09		
Jurisdiction size	0.19	3.35 ^b	0.19
Rurality	0.09		
Extent to which agency interacts with hospitals	0.27 ^a		
Productivity of agency's relationships with hospitals	0.11		
Jurisdiction size	0.25 ^c	2.16	0.13
Rurality	0.03		
Extent to which agency interacts with physicians and private clinics	0.17		
Productivity of agency's relationships with physicians and private clinics	0.09		
Jurisdiction size	0.19	1.82	0.13
Rurality	0.02		
Extent to which agency interacts with community health centers and migrant health clinics	0.29 ^c		
Productivity of agency's relationships with community health centers and migrant health clinics	-0.05		
Jurisdiction size	0.27 ^a	3.81 ^b	0.21
Rurality	0.03		
Extent to which agency interacts with community members	0.09		
Productivity of agency's relationships with community members	0.31 ^a		
Jurisdiction size	0.28 ^a	3.84 ^b	0.21
Rurality	0.05		
Extent to which agency interacts with citizens' groups	0.18		
Productivity of agency's relationships with citizens' groups	0.22 ^c		
Jurisdiction size	0.38 ^b	3.84 ^b	0.17
Rurality	0.09		
Extent to which agency interacts with state agencies	-0.09		
Productivity of agency's relationships with state agencies	0.39 ^b		
Jurisdiction size	0.31 ^a	2.75 ^a	0.17
Rurality	0.04		
Extent to which agency interacts with federal agencies	-0.21		
Productivity of agency's relationships with federal agencies	0.39 ^b		
Jurisdiction size	0.29 ^a	1.19	0.13
Rurality	0.16		
Extent to which agency interacts with universities	0.11		
Productivity of agency's relationships with universities	0.09		

^aP ≤ 0.05 ^bP ≤ 0.01 ^cP ≤ 0.08

was a more consistent predictor of performance than extent of interactions, however. Specifically, the more productive the agency's relationship with city/county government, boards of health, community members, and state and federal governments were perceived to be, the better the directors perceived the agency's performance.

While the results suggest that collaboration—at least with certain types of partners—promotes better public health performance, it is also possible that external organizations are choosing to work with local public health agencies that are seen as doing a good job.

The results also suggest that frequent interaction may be a predictor of productive relationships. Researchers have found that organizations must “court” each other as they develop partnerships and then work to maintain the relationship after the courtship is over.^{10,11} Further, in a detailed analysis of the literature on interorganizational collaboration, Mattesich and Monsey found that open and frequent communication—in which partners “interacted often, updated one another, discussed issues openly, and conveyed all necessary information to each other”—was a key ingredient of effective collaboration.²³ Process and qualitative research may provide further insights about how a productive relationship is established: for example, to achieve optimal results do employees with decision-making power need to be involved, or can interactions among line employees pave the way for interactions at policy levels? Future research should also investigate dilemmas that may be faced when organizations have different priorities and philosophies, for example, when establishing a relationship with one organization may threaten relationships with competing organizations.

The finding that local public health departments interact with a variety of external organizations and groups to carry out the core public health functions confirms the results of previous studies. In general, agencies reported high levels of interaction with other organizations in the public sector such as city and county government, schools, boards of health, and state agencies. These public sector organizations may share elements of a common organizational culture, a feature that makes it easier for them to work together.^{10,11} Almost one-half of the agencies reported frequent interactions with citizens' groups and almost two-thirds reported “moderately” or “very” productive interactions with these groups. This finding is encouraging since research shows that successful public health programs are adapted to the specific needs, assets, and interests of local populations.^{2,9} Links to neighborhoods and citizens' associations can be a key asset in connecting with the citizenry.²⁴

In contrast, fewer local public health departments reported interacting with hospitals, physicians/private clinics, federal agencies, community health centers/migrant clinics, and universities. The lack of interactions and the generally low productivity of relationships with universities reported here, while disturbing, is not a new finding. Unfortunately, many barriers, including differences in organizational culture, perspectives on action vs planning, and time perspectives, contribute to this gap.²⁵

Almost 20% of the agencies reported no or few interactions with hospitals, and another 42.2% reported interacting with hospitals only to “some” extent. Given the importance of interactions with hospitals shown in the regression analyses, more local public health agencies might explore opportunities for collaboration on issues such as community assessment, required by the Joint Commission on Accreditation of Healthcare Organizations, and care of the indigent and uninsured (decreasing emergency department use). Public health agencies' historical competency in both of these areas positions them to serve as community leaders in such efforts. Future public health-managed care partnerships might also pave the way for increased interactions with local physicians and private clinics.⁴

The lack of interactions and productive relationships with federal agencies may be due to most federal funds flowing through the state rather than directly to local public health departments. Those agencies that do interact with the federal government may be the high performers that are more likely to attract federal grants. The lack of interactions with community health centers and migrant health clinics is also notable. Two factors may contribute to this. First, not all communities have community health centers or migrant clinics. And second, in some areas of North Carolina, historically there has been a perception of competition between community health centers and local public health departments.

Fourth, the data show that North Carolina local public health agencies are interacting with others to take action on a wide variety of health issues. The lack of interaction around mental health and substance abuse is notable; about two-thirds of the departments reported no or little interaction around this issue. While substance abuse lies within the domain of mental health agencies in NC, its contribution to public health problems such as violence, HIV/AIDS, and TB suggests that it will be critical for local public health departments to increase their work with other organizations to prevent these problems in the community. Here, local public health departments' distinctive competence in prevention could augment the efforts of individual client-focused treatment agencies.

And the co-occurrence of physical and mental health problems indicates that there might be fruitful avenues for cooperation. Certainly, public health, mental health, and other community agencies and groups could together support efforts to address some of the root causes of both physical and mental illness, including poverty, lack of education, racism, and lack of social support.²⁶

Limitations. Because the study was cross-sectional, rather than longitudinal, its conclusions about the relationships between collaboration and performance are preliminary. Future research should examine the relationship between collaboration and performance over time and from the perspective of different staff members and organizations.²⁷ Future studies should also employ objective, rather than perceptual, measures, of performance to the extent possible. While the four-item performance measure used in this study has been tested elsewhere, Miller

and his associates have cautioned that the importance of these four questions might be more conceptual than practical.¹⁹ Whatever the measure of performance, it is crucial to link performance on the core functions with community health status improvements in future research.

Collaboration has been promoted as a remedy for many community health issues. Given the multicausal determination of health, further research using health outcome measures is needed to help us determine if collaboration and performance on the core functions do indeed facilitate better health in the community.

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